How Central and Eastern European Countries Choose Exchange Rate Regimes

Agnieszka Markiewicz[1]

In this study, we identify the main determinants of the exchange rate regime choices in Central and Eastern European countries (CEECs). For this purpose, we use an ordered logit model for the official (de jure) and the actual (de facto) exchange rate classifications. We find that trade openness and concentration, inflation differentials, international reserves stocks and financial conditions are the main determinants of the selection of exchange rate regimes in the CEECs.

1 Introduction

The issue of the appropriateness of the exchange rate regimes in the Central and Eastern European countries (CEECs) has taken center stage in the policy debate owing to the recent enlargement of the European Union (EU) and the ensuing possibility of the new Member States joining the euro area.

The objective of this paper is to investigate the main determinants of the selection of exchange rate regimes in CEECs. First, we employ a large range of potential determinants of exchange rate regimes and compare their capacity to explain the choice of regimes among CEECs. Second, we consider the choice of exchange rate regimes according to official (de jure) and de facto classifications, using both classifications in a way in which, to our knowledge, it has not been used before in the existing empirical literature. We include the category of hard peg to test explicitly for the "corner solutions" hypothesis and embody our hypotheses in an ordered logit model for an unbalanced panel of ten countries.

The sample comprises eight new EU Member States – the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. In addition, we included Bulgaria and Romania to diversify our sample. These two economies have made less progress in managing the transition to a market economy and in stabilizing their economies than the eight new EU members. Our study is based on the period between 1993 and 2002. We chose 1993 as the starting date, as data is only available from that time on. In contrast with other works, this empirical study takes into consideration the most recent developments in the CEECs' exchange rate strategies, which were stimulated by the perspective of joining the euro area.

The remainder of the paper is organized as follows: Section 2 provides a literature overview on the issue of exchange rate regime choice, while section 3 describes developments in the CEECs' exchange rate strategies and discrepancies of de facto and de jure classifications in these countries. Furthermore, we briefly touch upon the exchange rate strategies in other transition economies. Section 4 reviews the different approaches and the associated theoretical determinants of the exchange rate regime choice. In section 5, we develop the baseline econometric model of exchange rate regime choice. The results of our estimations are presented in section 6, and the

[1] *Center for Economic Studies, Department of Economics, Naamsestraat 69, 3000 Leuven, Belgium, Agnieszka.Markiewicz@econ.kuleuven.ac.be.* *I thank Paul De Grauwe, Kristien De Smedts, Geert Dhaene, Peter Backé and Balázs Égert for useful comments and Irene Popenberger for language advice. This paper received the Olga Radzyner Award of the Oesterreichische Nationalbank in 2005. The views expressed in this paper do not necessarily represent those of the Oesterreichische Nationalbank.*

development in the CEECs is compared with that in other transition economies in section 7. Conclusions are drawn in section 8.

2 Literature Overview

The literature on exchange rate regime choice is extensive. The research inspired by Mundell's seminal paper (1961) on optimum currency areas (OCAs) focuses on the structural characteristics of a country. These characteristics include factor mobility (Mundell, 1961), economic size and openness (Mundell, 1961), the geographical concentration of trade (McKinnon, 1963) and the diversity of production structures (Kenen, 1969). Mundell (1963) and Fleming (1962) extended the OCA theory by including the factor of capital mobility. According to their analysis, the choice between fixed and flexible regimes depends on the source of possible shocks. Although the OCA theory has been used extensively to explain the choice of exchange rate regimes, the empirical findings did not permit drawing clear conclusions about the relevant determinants of this choice. As a result, other factors have been suggested to explain it. For instance, Edwards (1996) and Collins (1996) argued that political variables can explain the selection of exchange rate policies. The currency crisis literature has also been used to assess the importance of potential determinants for the choice of an exchange rate regime. For instance, Ozkan and Sutherland (1995) suggested that a variety of factors that may affect the authorities' objective functioning could be used as indicators of a currency crisis and thus as determinants of exchange rate regime choices. Masson and Ruge-Murcia (2003) estimated a Markov chain model of the exchange rate in which currency crisis variables play an important role. Numerous recent studies cover a large range of these factors (see, e.g. Poirson, 2001; von Hagen and Zhou, 2004; Bordo, 2003; Levy-Yeyati and Sturzenegger, 2004; and Rizzo, 1998). Few economists, however, have focused in particular on the problem of exchange rate regime choice in the CEECs. Corker et al. (2000) and Backé (1999) examined the issue for some of the transition economies in a descriptive study. Bénassy-Quéré and Lahrèche-Révil (1998) as well as Boone and Maurel (1999) approached the question of regime selection in CEECs empirically, but only via OCA theory characteristics. Finally, this problem was examined by von Hagen and Zhou (2002). They developed an empirical model of the exchange rate regime choice of a group of 25 transition economies in the 1990s. Their model tests for the relevance of OCA variables, financial development measures and crisis variables to exchange rate regime selection. Moreover, the authors assess the discrepancies between de jure and de facto regimes in transition economies. However, they do not account for political conditions, which seem to be an important factor in the CEECs' selection of an exchange rate system.

3 Exchange Rate Regimes in CEECs

The CEECs have adopted rather diverse exchange rate regimes and monetary strategies since the early 1990s. Their monetary and exchange rate strategies can be divided into three phases in accordance with the challenges they were confronted with. Table 1 shows the development of de jure and de facto exchange rate regimes in ten CEECs.

3.1 Development of Exchange Rate Regimes in CEECs

During the first phase, between 1990 and 1994, the monetary authorities focused on stabilizing the economy. Most CEECs entered the transition process with a monetary overhang and experienced high inflation rates. In order to combat inflation, several countries initially opted for the external anchor in the form of pegged exchange rates (e.g. Czechoslovakia – later the Czech Republic and Slovakia – and Hungary). A few countries (e.g. Bulgaria and Romania) initially adopted flexible exchange rate regimes, despite being confronted with high inflation rates. This choice may have been attributable to the relatively low level of international reserves these countries held in the early 1990s,[2] which made it difficult to back a peg.

Until the mid-1990s, most CEECs made strong progress toward disinflation, in particular thanks to the fixed exchange rates. When the need to stabilize the economy with an external anchor became less acute, several countries gradually opted for a more flexible exchange rate strategy. Still, not all the CEECs adopted a more flexible regime. The Baltic countries and Poland maintained the fixed or intermediate exchange rate regimes they had initially chosen, while Slovenia and Romania continued to use flexible regimes. Bulgaria was the main exception, as it steered in the opposite direction, abandoning a relatively flexible regime and adopting a currency board arrangement.

Given the perspective of joining monetary union, several CEECs chose to change their exchange rate policies between 2000 and 2002. A number of CEECs aligned their regimes with the institutional requirements of future participation in the monetary union. In February 2002, Lithuania repegged its currency board from U.S. dollar to the euro. In January 2000, Hungary introduced an exchange rate system that shadows the exchange rate mechanism ERM II. There is, however, one fundamental difference between this arrangement and actual participation in ERM II: Hungary made a unilateral commitment to maintain the parity, whereas ERM II is a multilateral binding arrangement between the National Central Banks (NCBs) and the European Central Bank (ECB). Latvia, with its peg to the Special Drawing Rights (SDR) of the International Monetary Fund (IMF), has had to adapt its regime to the conditions required for joining ERM II. By contrast, Poland, the Czech Republic, Slovakia and Romania still use a floating regime. Slovakia and Poland switched to more flexible regimes in 1998 and 2000, respectively.

Although our sample period ends in 2002, it is important to note that seven of the ten new Member States have already joined ERM II. Estonia, Lithuania and Slovenia were the first to do so in June 2004. Cyprus entered ERM II in April 2005, Malta and Latvia followed suit in May 2005, while Slovakia joined ERM II in late November 2005.

3.2 Classification of Exchange Rate Regimes in CEECs

In order to study exchange rate regime choices, it is necessary to employ the proper classification of exchange rate systems. Recently, numerous empirical studies have provided evidence that adjustments of central parities and foreign

[2] *In 1992 and 1993, Bulgaria and Romania held, on average, only one-fifth of the reserves Poland or Hungary possessed in the same period.*

exchange market interventions can generate exchange rate regimes that differ considerably from the official arrangements.[3] First, a country may experience only very small exchange rate movements, even though the monetary authorities have made no official commitment to maintaining the parity. This behavior is often referred to as the "fear of floating" phenomenon. Second, a country can manifest "fear of pegging" behavior. This is the case when a country that claims to have a pegged exchange rate regime in fact carries out frequent changes in parity.

The approach taken here is, first, to report results according to the official classification, which uses the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. Then we supplement these results with a de facto classification based on a measure developed by Reinhart and Rogoff (2002). Empirical studies used to assign exchange rate regimes (both de facto and de jure) to three categories – peg, intermediate and float, whereas recent works often try to assess whether emerging markets switch to the "corner solutions."[4] This hypothesis, however, cannot be tested, as hard and soft pegs fall into the same category: According to the "bipolar view" literature, one of the corner solutions is a hard peg, while a soft peg is perceived as an intermediate regime. A distinction between the two is thus a necessary prerequisite for investigating the "corner solutions" hypothesis. We followed this line of argumentation, distinguishing between soft pegs and hard pegs in our study. The de jure exchange rate regimes are classified into four principal categories: hard peg, soft peg, intermediate and float regimes. Hard pegs include currency boards, while soft pegs contain single currency pegs, SDR pegs and other narrow bands (less than $\pm 1\%$) that are not constrained by the central bank's strong commitment. The intermediate category includes tightly managed and broad band exchange rate systems (at least $\pm 1\%$). Finally, the float category includes managed floats without preannounced exchange rate paths and free floats. The de facto regimes are also classified into four groups. We regrouped the Reinhart and Rogoff categories into four groups following the IMF's definition of the regimes.

Table 1 shows the de jure and the de facto regimes in CEECs. What is striking at first glance is that there are no substantial differences between the development of de jure and de facto regimes.

During the stabilization phase, hard and soft pegs made up an almost equal share of de jure and de facto exchange rate regimes. Floating regimes were more frequent in de jure regimes, indicating a "fear of floating."

During the transition phase, several countries switched to more flexible regimes. Accordingly, the number of de jure and de facto floaters increased between 1995 and 1999. This change in exchange rate strategies was consistent with the progressive capital account liberalization in the CEECs and the increasing risk of speculative attacks. The number of intermediate regimes declined in this period, whereas the number of soft pegs remained stable.

[3] *For a detailed discussion of the discrepancy between de facto and de jure exchange rate regime classifications, see Calvo and Reinhard (2000), Gosh et al. (1997), and Levy-Yeyati and Sturzenegger (2005).*

[4] *The proponents of the "corner solutions" hypothesis emphasize the increasing role of pure floats and hard pegs as sustainable solutions in emerging economies and maintain that all other exchange rate regimes (called "vanishing middle") are unsustainable in the long run.*

Table 1

De Jure and De Facto Classification of Exchange Rate Regimes in CEECs

	Year	BG	CZ	EE	HU	LV	LT	PL	RO	SK	SL
Stabilization phase	1993	0(0)	2(1)	3(3)	2(1)	0(0)	0(0)	1(0)	0(0)	2(0)	0(1)
	1994	0(0)	2(1)	3(3)	2(1)	2(2)	3(3)	1(0)	0(0)	2(1)	0(1)
Transition phase	1995	0(0)	2(1)	3(3)	1(1)	2(2)	3(3)	1(1)	0(0)	2(1)	0(1)
	1996	0(0)	1(1)	3(3)	1(1)	2(2)	3(3)	1(1)	0(0)	1(1)	0(1)
	1997	3(3)	0(0)	3(3)	1(1)	2(2)	3(3)	1(1)	0(0)	1(1)	0(1)
	1998	3(3)	0(0)	3(3)	1(1)	2(2)	3(3)	1(1)	0(0)	0(1)	0(1)
	1999	3(3)	0(0)	3(3)	1(1)	2(2)	3(3)	1(1)	0(0)	0(1)	0(1)
Preparation phase	2000	3(3)	0(0)	3(3)	1(1)	2(2)	3(3)	0(0)	0(0)	0(1)	0(1)
	2001	3(3)	0(0)	3(3)	1(1)	2(2)	3(3)	0(0)	1(1)	0(1)	0(1)
	2002	3(3)	0(0)	3(3)	1(1)	2(2)	3(3)	0(0)	1(1)	0(1)	0(1)

Source: IMF (various issues), Reinhart, C. and K. Rogoff, 2002.
Notes: De facto exchange rate regimes are presented in parentheses.
0 (float): independent floating (market-determined exchange rate and independent monetary policy); managed float with no preannounced path for the exchange rate.
1 (intermediate): exchange rates with crawling bands; crawling pegs; pegged exchange rate arrangements within horizontal bands (at least ±1%).
2 (peg): fixed peg arrangements within a band of no more than ±1%.
3 (hard peg): currency board arrangements.

During the last, preparatory phase, the de facto and de jure regimes clearly converged. This observation is in line with findings by Masson and Ruge-Murcia (2003). They argue that once inflation has decreased and gross domestic product (GDP) growth can be maintained in emerging economies, intermediate regimes may be able to resist speculative attacks. Indeed, at the end of the observation period, we note a strong decline in inflation and stable growth in the CEECs. Therefore, there is no incentive for these countries to adopt corner solutions and implement different strategies.

The choice of exchange rate regimes in other transition economies (TEs)[5] was guided by somewhat different circumstances, most notably by the slower progress in macroeconomic stabilization: At the end of the 1990s, the TEs were still struggling with two-digit inflation rates. Most of these economies were also heavily dollarized, so that all exchange rate changes had a considerable impact on their financial stability. Therefore, they often relied on de facto nominal exchange rate anchors, even though their currencies were officially floating. Markiewicz (2006) observed a *fear of floating* that made most of them de facto anchor exchange rate regimes to the U.S. dollar. Schnabl (2005) even maintained that the countries of the Commonwealth of Independent States (CIS) adopted an informal dollar standard.

4 Theoretical Determinants of Exchange Rate Regime Choice

Our analysis of the determinants of exchange rate regime choice in CEECs centers on three main approaches. The traditional approach is embodied in the OCA theory and its extension, the concept of the impossible trinity. Today's discussions on the choice of exchange rate regimes include the political

[5] *In this context, the term "transition economies" (TEs) refers to the following countries: Albania, Armenia, Azerbaijan, Belarus, Croatia, Georgia, Kazakhstan, Macedonia, Moldova, Russia, Tajikistan, Turkmenistan and Ukraine.*

economy view and the currency crisis approach. These traditional and modern models imply a set of potential determinants of exchange rate regime choice. We included ten of them as explanatory variables in the specification.

4.1 OCA Theory and the Impossible Trinity

The early literature based on Mundell's OCA theory concentrated on geographical and trade characteristics. This approach weighs the trade and welfare gains in a fixed exchange rate regime against the benefits of exchange rate flexibility as a shock absorber in the presence of nominal rigidities. Since stable exchange rates increase trade gains, pegs are more suitable for countries characterized by a high degree of trade openness. A rigid regime is also preferred in small economies, as they tend to trade more internationally. Finally, a strong geographical concentration of a country's trade favors pegging its currency to that of its main trading partner.

In order to test the relevance of the traditional OCA hypothesis in CEECs, we use measures of the countries' size (*GDP* as real GDP; for details regarding the units used in the text below and in table 2, see table 4), openness (*Openness* as the GDP share of exports plus imports) and concentration of trade with the EU countries (*Trade*).[6, 7]

Mundell (1963) and Fleming (1962) extended the OCA theory by including the factor of capital mobility. Their model indicates that it is impossible to simultaneously achieve the following three goals: exchange rate stabilization, capital market integration and the pursuit of an independent monetary policy. This is usually referred to as the impossible trinity. The currency crises in Mexico, Asia, Brazil and Russia as well as increasing capital mobility brought the impossible trinity hypothesis to the forefront and resulted in the bipolar view of exchange rate regimes. According to this approach, intermediate regimes are less viable in financially open economies owing to the high level of capital mobility.[8] Since monetary policy in financially open economies cannot aim at maintaining a stable exchange rate while at the same time attempting to smooth cyclical output fluctuations, these countries should move to corner solutions, i.e., a pure float or a hard peg.

The rapid process of financial deepening and innovation has reduced the effectiveness of capital controls. Consequently, the traditional trinity dilemma has been reduced to a tradeoff between monetary policy independence and exchange rate stability. Moreover, countries with relatively undeveloped financial sectors lack market instruments to conduct domestic open market operations. Thus, low financial development will increase the probability of adopting pegs.

We assess the empirical relevance of the impossible trinity approach, employing a capital control index (*Restrictions*) and the ratio of private credit to GDP (*Credit*, a measure of financial development), both lagged one period, as explanatory variables.

[6] *We use lagged values of these variables to minimize potential endogeneity problems.*
[7] *We choose the EU as a benchmark for geographical trade concentration because it is the CEECs' main trade partner.*
[8] *See e.g. Fischer (2001).*

4.2 Currency Crisis

The early literature of balance of payments crises (Krugman, 1979) stressed that crises were caused by weak "economic fundamentals," such as excessively expansionary fiscal and monetary policies. It shows that in a fixed exchange rate regime, domestic credit expansion in excess of money demand growth leads to a gradual but persistent loss of international reserves and, ultimately, to a speculative attack on the currency. The empirical implication of this model is that expansionary monetary policy combined with a fixed exchange rate leads to external imbalances. As a consequence, a country experiencing a high rate of inflation might be reluctant to fix its exchange rate. Schardax (2002) argues that the exchange rate crises in the CEECs may be considered as "first generation" balance of payments crises in the spirit of Krugman (1979). Following this argument, we introduce two "first generation" crises indicators: inflation rate differential (*Inflation*) and foreign exchange reserves (*Reserves* as the ratio of international reserves to broad money).[9]

While this traditional approach stresses the role of declining international reserves in triggering the collapse of a fixed exchange rate regime, some recent models, e.g by Ozkan and Sutherland (1995), suggest that the decision to abandon the parity or choose a flexible regime may stem from the authorities' concern about the development of other key economic variables. For instance, an increase in the domestic interest rate that is needed to maintain a fixed exchange rate may result in higher financing costs for the government. The decision to adopt a peg may thus depend on the public deficit. This might be a strong argument particularly in the CEECs, since these countries wish to join the euro area and, therefore, have to comply with the convergence criteria.[10] Moreover, the budget deficit was found to be a significant predictor of exchange rate crises in CEECs (see Brüggemann and Linne, 2003). It is important to note that fixed regimes provide more fiscal discipline than the flexible ones. We investigate the relevance of the public deficit to the choice of the exchange rate regime by using the level of government deficit as a percentage of GDP (*Deficit*) as a regressor. Again, all crisis variables will be lagged one period.

4.3 Political Economy

Numerous authors emphasize the credibility gains associated with adopting a peg arrangement.[11] They maintain that governments with a low level of institutional credibility that are willing to convince the public of their commitment to price stability may adopt a peg as a "policy crutch" to tame inflationary expectations. Accordingly, weak governments that are more vulnerable to expansionary pressures may choose to use a peg as an instrument to eliminate (or considerably reduce) these pressures. In addition, some authors argue that a fixed exchange rate disciplines the government because an

[9] *We use the German inflation rate as a benchmark inflation rate, assuming that it is a good approximation of the average inflation rate in Europe, since in the 1990s, most European countries followed the monetary policy of the Deutsche Bundesbank.*

[10] *The convergence criteria impose a 3% limit on public deficit and a 60% limit on public debt, both as a share of GDP.*

[11] *See the precursors Barro and Gordon (1983), Giavazzi and Pagano (1998), as well as Drazen (2000).*

excessively expansionary fiscal policy may lead to a currency crisis.[12] Collins (1996) and Edwards (1996) build their empirical models around a framework in which the political cost associated with devaluation under fixed exchange rates plays a major role. While Collins does not directly use political economy variables in her analysis, Edwards introduce variables that measure the degree of political stability and the strength of the government. He argues that weaker governments and unstable political environments reduce the likelihood of a peg being adopted. His results support the "sustainability hypothesis," as opposed to the "policy crutch" approach.

In order to investigate which political economy approach is appropriate to explain the exchange rate regime choices in the CEECs, we follow the line of argumentation used by Edwards (1996) and employ two indices. The strength of the government is measured as the fraction of seats the ruling party (or parties) holds in the lower chamber of parliament (*GovStrength*). The second index (*PolStab*) focuses on instances involving a transfer of power from the government party or organization to an opposition party or organization. This index measures the stability of the political system, since its value increases with the number of years that this party or coalition is in office.[13]

5 Baseline Model Explaining Regime Choice

In this section we present the econometric model that is applied to test the hypotheses presented in the previous section in a unified framework. We use a discrete variable $y_{i,t}$ to describe exchange rate regime choices. In line with our classification presented in section 3, this variable can take one of the following four values:

$y_{i,t} = 0$, if a flexible regime is chosen by country i in year t,

$y_{i,t} = 1$, if country i chooses the intermediate regime in year t,

$y_{i,t} = 2$, if a soft peg is chosen by country i in year t,

$y_{i,t} = 3$, if a currency board arrangement is adopted by country i in year t

with the probabilities p_i where i=0, 1, 2, 3 and $\sum_{i=0}^{3} p_i = 1$. This choice is based on the continuous latent variable $y^*_{i,t}$ (attractiveness of a fixed exchange rate regime), which is a linear function of all the economic variables discussed above.

$$y^*_{i,t} = Z_{i,t} + u_{i,t} \text{ for } i = 1,2,...,N;\ t = 1,2,...,T_i \qquad (1)$$

where $Z_{i,t}$ is a vector of explanatory variables, N is the number of countries, and T_i denotes the number of observations for country i. The likelihood that a country belongs to a category is defined in terms of the probability regarding the value of an underlying latent variable $y^*_{i,t}$. We assume that a country

[12] *See Aghevli et al. (1991).*
[13] *For details on the construction of this measure, see table 4.*

chooses a flexible exchange rate regime when the latent variable is below a certain threshold level c_1:

$$y_{i,t} = 0, \text{ if } y^*_{i,t} < c_1 \quad (2)$$

When the latent variable is between the two thresholds c_1 and c_2, the country adopts an intermediate regime:

$$y_{i,t} = 1, \text{ if } c_1 < y^*_{i,t} < c_2 \quad (3)$$

If the latent variable takes values between c_2 and c_3, the country chooses a soft peg:

$$y_{i,t} = 2, \text{ if } c_2 < y^*_{i,t} < c_3 \quad (4)$$

Finally, if the latent variable exceeds c_3, the country adopts a currency board arrangement:

$$y_{i,t} = 3, \text{ if } y^*_{i,t} > c_3 \quad (5)$$

These three thresholds ($c_1<c_2<c_3$) are estimated in our analysis along with the coefficients of the explanatory variables of the vector $Z_{i,t}$. The probabilities of $y_{i,t}$ being classified as flexible, intermediate, pegged or hard peg are given by

$$Pr(y_{i,t} = 0) = Pr(Z_{i,t} + u_{i,t} < c_1) \quad (6)$$

$$Pr(y_{i,t} = 1) = Pr(c_1 < Z_{i,t} + u_{i,t} < c_2) \quad (7)$$

$$Pr(y_{i,t} = 2) = Pr(c_2 < Z_{i,t} + u_{i,t} < c_3) \quad (8)$$

$$Pr(y_{i,t} = 3) = Pr(Z_{i,t} + u_{i,t} > c_3) \quad (9)$$

We can assume here that the error term follows the logistic or normal distribution. As the (Akaike, Schwarz and Hannan-Quinn) information criteria do not indicate clearly which model (probit or logit) is superior for our data set, we assume the error term $u_{i,t}$ to be *iid* with a logistic distribution function with a mean of 0 and a variance of $\frac{\pi^2}{3}$. Since the probit estimations provide similar results, our arbitrary choice of logistic distribution does not have any negative consequences on the quality of our findings. Since the values of the exchange rate regime variable can be logically ordered, this gives rise to an ordered logit. The estimates of the coefficients of the vector $Z_{i,t}$ and the thresholds c_1, c_2 and c_3 are obtained by maximizing the likelihood function using the quadratic hill climbing algorithm. We pool all country-year observations and make an ordered logit estimation.

6 Econometric Results and Implications

In this section we empirically assess the relevance of the hypotheses underlying the three approaches to the actual exchange rate regime choice in the CEECs. We estimate the specification for de jure and de facto classifications.

The results of de facto and de jure classification estimations are reported in table 2. Results corresponding to the de jure specification are shown in parentheses next to the de facto findings. A positive sign of a coefficient means that an increase in the associated variable raises the probability that the country will adopt a hard peg. In order to facilitate an interpretation of the results, we also report the discrete changes in the probabilities of choosing a hard peg *(y=3)*, a soft peg *(y=2)*, an intermediate regime *(y=1)* and a float *(y=0)* for significant coefficients. These changes denote the differences in the predicted probabilities when one explanatory variable changes by one unit and all the other regressors are held at their means.

Table 2

Determinants of De Facto and De Jure Exchange Rate Regimes

			Changes in Probabilities			
Variable	Coefficient	z-statistic	y=0	y=1	y=2	y=3
Openness	0.05129 (0.03365)	4.19*** (2.65**)	−0.0024 (−0.0051)	−0.0068 (−0.0029)	0.0055 (0.0052)	0.0038 (0.0027)
GDP	0.00532 (0.01798)	0.56 (2.02**)	(−0.0027)	(−0.0015)	(0.0028)	0.0014
Trade	−0.13093 (−0.18423)	−4.75*** (−5.36***)	0.0061 (0.0277)	0.0175 (0.0156)	−0.014 (−0.0286)	−0.0096 (−0.0142)
Restrictions	−0.85255 (−1.51847)	−2.25** (−4.01***)	0.0401 (0.2283)	0.1139 (0.129)	−0.0914 (−0.2361)	−0.0625 (−0.1212)
Credit	−0.75441(−0.78581)	−3.58*** (−3.00**)	0.0354 (0.1182)	0.1007 (0.0668)	−0.0809 (−0.1222)	−0.0553 (−0.0627)
Inflation	0.00326 (0.00384)	1.96** (1.65*)	−0.0002 (−0.0006)	−0.0004 (−0.0003)	0.0003 (0.0006)	0.0002 (0.0003)
Deficit	−0.0032 (−0.00471)	−1.29 (−1.51)	0.0002			
Reserves	0.27729 (−0.17684)	1.77* (−0.17)	−0,013	−0,037	0.0297	0.0203
PolStab	−0.20596 (−0.30458)	−1.34 (−1.82*)	0.0458	(0.0259)	(−0.0474)	(−0.02431)
GovStrength	0.06609 (0.08471)	2.34** (2.66**)	−0.0031 (−0.0127)	−0.0088 (−0.0072)	0.0071 (0.0132)	0.0048 (0.0068)
Log likelihood	−65.695 (−71.5927)					
LR $x^2(11)$	72.76 (43.83)					
Predictive power	62% (65%)					

Source: Authors' calculations.

*Notes: * z statistics significant at 10%; ** at 5%; *** at 1%. The numbers in parentheses correspond to the de jure specification. Changes in probabilities for nonsignificant coefficients are not reported. The x^2 value is defined as 2(L1-L0), where L1 is the value of the log-likelihood function with only the constant term, and L0 is the value of the log-likelihood function when all the explanatory variables are included. Since for ordered logit models the R^2 is meaningless, we report here an appropriate measure of goodness of fit, i.e. predictive power of the specification. This measure computes the share of regimes correctly predicted by the model.*

First of all, we note that there are only few differences between the results of de facto and de jure specifications. This is not surprising, given that the discrepancies between the two classifications are not substantial.[14] In the recent literature, many de facto measures of exchange rate regimes were developed that seemed to differ from one another.[15] Therefore, we also employed the de facto classification as proposed by Levy-Yeyati and Sturzenegger (LYS) in addition to the Reinhart and Rogoff measures. As the results of the estimations carried out with LYS exchange rate regimes are very similar to the others, we report only the results of the de facto measure by Reinhart and Rogoff.

[14] *See section 3.*

[15] *Frankel (2003) shows that Calvo and Reinhart's measure of de facto exchange rate regimes differs considerably from the LYS classification.*

The results suggest that seven (eight) out of ten explanatory variables actually play a role in the choice of de facto (de jure) exchange rate regimes in the CEECs. The de jure specification exhibits a higher level of predictive power (65% against 62% obtained with de facto exchange rate arrangements) for all exchange rate regimes in the CEECs. Table 2 shows that the OCA indicators are significant determinants of exchange rate regime choices in the CEECs. More open CEECs tend to adopt more rigid exchange rate regimes. An increase by 1 percentage point in the openness ratio ceteris paribus increases the probability of choosing a de facto soft peg by 0.0055. We find that the coefficient of trade concentration has a negative sign, thus contradicting the OCA theory. A country will be less likely to adopt a fixed exchange rate, if its external trade is highly concentrated on EU countries. This result may be explained by the "sustainability hypothesis." Very open economies with a high degree of geographical trade concentration are more vulnerable to external shocks, which makes it more difficult to sustain pegs. Since open CEECs are more prone to choose fixed regimes, they will do so only if their trade is not highly concentrated. This result is substantiated by other works (e.g. by Poirson, 2001; Savvides, 1990 and von Hagen and Zhou, 2004). The size of the economy (in terms of GDP) is a significant variable only in the de jure specification. The sign of its coefficient again contradicts the OCA theory. Bigger economies favor pegs.[16] Since the coefficient denoting the size of the economy is not significant in the de facto specification, we believe that the contradictory significant sign is attributable to classification issues.

Turning to the impossible trinity hypothesis, both coefficients indicate that financial globalization has a significant impact on the choice of the exchange rate regime. The development of the financial sector (*Credit*) favors the choice of more flexible exchange rate systems, which is in line with expectations. However, the countries that are more integrated into capital markets (*Restrictions*, decrease of restrictions) are more prone to adopt a peg. According to the "bipolar view," financially open countries should opt for a hard peg or a pure float. The results show that as the CEECs open their capital account, they move toward the rigid corner solution.

The larger the inflation differential (*Inflation*) with Germany, the larger the likelihood of adopting a fixed regime. This result contradicts the currency crisis approach. As mentioned in section 4, a country experiencing a high rate of inflation may be reluctant to fix its exchange rate. In the CEECs, however, the fixed exchange rate was often used as an external anchor to bring down inflation expectations. Therefore, a higher inflation rate implies a higher probability of adopting a peg in these countries. The budget balance (*Deficit*) does not play a significant role in the selection of the exchange rate regime in the CEECs. The size of the foreign international reserves is a significant determinant of de facto but not of de jure regime choices. As already mentioned

[16] *The robustness checks show that this result is attributable to the presence of the trade concentration variable in the model. Since the latter is a ratio of exports to GDP, there is a high correlation (0.5) between the size of the economy (GDP measured as real GDP) and the trade concentration variable (Trade). When we run a regression omitting the trade concentration indicator, the size of the economy seems to be an insignificant variable. The coefficient of geographical trade concentration remains significant and keeps its sign, no matter which specification we use.*

in section 2, CEECs that did not hold a sufficient stock of international reserves used flexible regimes. The de facto specification results confirm this observation: The higher the stock of international reserves in a country the more likely the adoption of a fixed exchange rate is.

Finally, the choice of the exchange rate regime depends significantly on the political conditions prevailing in the country. Both specifications suggest that stronger governments have a greater tendency than weaker governments to opt for a pegged system. However, the de jure results imply that politically unstable countries are more likely to adopt a rigid regime. This result is puzzling, so we checked for a correlation between these two variables. Although the correlation turned out to be low at 0.1566, we performed a likelihood ratio test. Its value was 22.55, which indicates that the two variables are jointly significant at the 1% level. In addition, we ran separate regressions with each of them. The results confirm the statistical significance and the signs of their coefficients. Since the political stability coefficient is not significant in the de facto specification, we believe that the de jure result is again attributable to the classification bias.

7 Comparing Regime Choices in CEECs and Other TEs

As already mentioned in section 3, the factors underlying the choice of exchange rate regimes in the other TEs are in several respects different from that in the CEECs. In Markiewicz (2006), we maintained that the estimations of the de jure and the de facto specifications generate different results for the TEs. More precisely, the de facto model has a better fit, as it does not produce the puzzling result for political variables found in the de jure specification. Furthermore, we showed that the CEECs are much more likely to adopt a de facto flexible regime than the other TEs. However, we also observed many similarities between the results of these two studies. In both cases, a country is less likely to adopt a fixed exchange rate if its external trade is highly concentrated with the EU and if its financial sector is more developed. Higher inflation favors a more rigid regime. Finally, in both cases, stronger governments tend to favor pegs. In TEs, the choice of the exchange rate regime seems to be guided by the size of the budget deficit, whereas this variable turns out to be insignificant in CEECs. More financially integrated CEECs are more prone to select rigid regimes; this factor does not play a role in the other TEs.

8 Conclusions

The objective of this study was to identify the determinants of exchange rate regime choices in CEECs. We proceeded in two steps. First, we built an extended specification of the exchange rate regime choice, considering the relevance of variables suggested by traditional and modern theories. Second, we employed two distinct classifications of exchange rate regimes, i.e., de jure and de facto classification. In order to test the validity of our hypotheses, we used an ordered logit framework.

We found that numerous factors influence the choice of exchange rate regimes in the CEECs. Since the variables used in our specification were measured in different units, it was impossible to assess their relative importance.

Still, we identified those indicators that seem to have guided the CEECs' choice of exchange rate regimes between 1993 and 2002.

Fixed exchange rate regimes are strongly associated with open economies, which confirms the OCA theory. However, a country is less likely to adopt a fixed exchange rate if its external trade is highly concentrated on EU countries, which contradicts the OCA theory. Our interpretation of this result is that very open economies with a high level of geographical trade concentration are more vulnerable to external shocks, which makes it more difficult to sustain a peg. Since open CEECs are more likely to choose fixed regimes, they do so only if their trade is not highly concentrated.

A country experiencing a high inflation rate differential is likely to adopt a peg as an instrument of disinflation policy. This confirms the idea that the CEECs used fixed exchange rate regimes as an instrument of importing credibility. By contrast, the "sustainability hypothesis" suggests that a high level of international reserves is required to lend credibility to a pegged regime.

Financial variables also play a significant role in the choice of the exchange rate regime. First, the development of the financial sector favors floats in the CEECs. Second, financial openness favors pegs. Since the impossible trinity approach rules out a combination of intermediate exchange rate regimes and open capital markets, more financially integrated countries switch to more rigid regimes (and ultimately hard pegs).

Finally, we find that stronger governments have a greater tendency than weaker governments to opt for a pegged system.

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Annex 1

Table 3

Frequencies of Exchange Rate Regimes

Regime	De jure		De facto	
	Value	Count	Value	Count
Pure float	0	26	0	38
Intermediate	1	40	1	20
Soft peg	2	9	2	17
Hard peg	3	25	3	25
Total		100		100

Source: IMF (various issues), Reinhart C. and K. Rogoff, 2002.
Notes: The second column includes the values of dependent variable. The third column reports a count and a percentage (since the number of all regimes is equal to 100) of the corresponding exchange rate regimes.

Annex 2

Table 4

Data Description

Variable	Definition and Source
Credit	Credit by commercial banks, normalized by GDP. Source: International Financial Statistics – IFS.
Deficit	General government budget balance, normalized by GDP. A positive entry denotes a surplus. Source: EBRD Transition Report.
De jure	Official exchange rate regimes. Source: IMF Annual Report on Exchange Arrangements and Exchange Restrictions.
De facto	Actual exchange rate regimes. Source: Reinhart C. and K. Rogoff, 2002.
GDP	Real GDP in USD billion. Source: IFS, various issues.
GovStrength	Strength of the government measured as the fraction of seats held by the government party or coalition in the lower chamber of parliament. Source: Database of Political Institutions 2000, Thorsten et al. (2001) and authors' calculations.
Inflation	Inflation differential (π-π^*) where π is a domestic inflation rate and π^* is a German inflation rate. Source: IFS.
Credit	Financial development measured as a ratio of private credit to GDP. Source: IFS.
Openness	Degree of trade openness measured as the ratio of exports and imports to GDP. Source: IFS.
PolStab	The value of this index increases by 1 with every year that the government stays in office. A transfer of power from a party or group in office to a party or group formally in the opposition reduces the value by 1. Source: www.electionworld.org, authors' calculations.
Reserves	International reserves measured as the ratio of international reserves (without gold) to broad money. Source: EBRD Transition Report.
Restrictions	Restrictions on capital movements. The index can take a value between 0 and 6, where 0 indicates no restrictions and 6 stands for completely closed capital account. Source: The index was created by Garibaldi P., N. Mora, R. Sahay and J. Zettelmeyer (IMF) and was updated by the authors.
Trade	Trade concentration with the EU measured as a ratio of exports from CEECs to the EU to a country's total exports. Source: IMF Direction of Trade Statistics.